

were we coming to? To science we owed every easement we enjoyed in the work of our daily life. Science enabled us, in comparison with past generations, to live our lives over and over again. It enabled us to travel such mighty distances within so short a space of time as a few years ago would have been inconceivable; and, what with the aid of the electric telegraph, it placed us in almost immediate communication with nearly all parts of the world. Having referred to the vast saving of manual labour which had been effected through the aid of science by machinery and appliances of various kinds, his Lordship expressed his gratification at the presence of representatives of so many branches of science.

Dr. Hooker, who was the first to respond, remarked that the occasion might be regarded as marking an important epoch in the history of science. It had been his pleasure to attend the various exhibitions for the promotion of science and art which had been held in this country and abroad by our own and by other Governments since 1851, and not only to study their contents but also to inquire into their origin and connection, and what might be called their individuality. With respect to the exhibition which the present banquet might be said to commemorate, he could see many marks which distinguished it from those that had gone before it. It had been brought to its present remarkable state by the indomitable energy of a very few workers whom it might be invidious to particularise, though he could not forbear mentioning the name of Mr. Lockyer. Originating as it did almost spontaneously, it had received the support of the Government from the active interest that was taken in it by the Lord President and the Vice-President of the Council, and from the diplomatic action which resulted in getting foreign Governments to send their delegates to visit the exhibition and to take part in conferences on the occasion of its opening. It had derived no small support from the countenance which had been graciously bestowed upon it by the Queen. In continuation, Dr. Hooker said, look at the state of science now and what it was 300 years ago. It had advanced with such strides as had marked the progress of no other branch of intellectual pursuit. Compare, or rather contrast, the progress of science in modern times with that of literature and the fine arts. With regard to literature, as with regard to the fine arts in this country, more especially in the case of sculpture and architecture, we had to look back ages almost to find a starting-point in their general progress, and even in the case of the most modern of the fine arts—painting—we were referred back to the cradles of its birth in Italy, Spain, and the Low Countries. With regard to the Exhibition for the Advancement of Science, what was to be its future? Was it to be a matter of a few weeks or months, and then to pass away for ever? It was to be hoped not. It was the earnest desire of scientific men to form the nucleus of a great national museum of a permanent character for the benefit not only of scientific men but for the benefit of the public in general, and he felt sure that science would not look to the public in vain for aid in the endeavour to realise that important object. It was an object worthy of great and noble efforts, and he felt assured that such efforts would not be wanting on the part of the City of London.

After a few remarks from Sir John Hawkshaw, Sir George Airy, the Astronomer Royal, replied for that branch of the toast which he represented, and spoke of science under two heads, which, for want of better terms, he said he might describe as practical and contemplative science. Of the present state of practical science it was impossible to speak too highly. It was impossible for any one who had even a partial acquaintance with what was going on in our manufacturing districts especially, and in all those labours which were for the benefit of mankind, not to be struck with the enormous amount of

ingenuity and enterprise which were brought to bear upon those industries with a view to material gain. Material gain was the aim of practical science. As for what he termed the contemplative branch of science, which embraced especially all those pursuits relating to the constitution of nature, the object in that case was not material gain or personal advantage, but the results at which it aimed were in their way not inferior to or less welcome than those of practical science.

Mr. Justice Grove in proposing "The Health of the Lord Mayor," humorously remarked that his lordship when inviting such a body of representatives of science to partake of his splendid hospitality, must have been actuated, not only by a lively sense of favours received, but also by a lively sense of favours to come. Mindful of what science had done for commerce and manufactures in the past, the first magistrate of the city of London had doubtless an eye at the same time to the advantages which manufactures and commerce would reap from the labours of science in the future. There was nothing in which the Lord Mayor could do himself more honour than in entertaining at his table the votaries of science, to whom, on the other hand, nothing could be more gratifying or encouraging than this mark of recognition and appreciation on his part of the value of their labours.

To the toast of "The Foreign Representatives of Science," Prof. Blaserna responded.

Altogether, we think, both the Lord Mayor and the representatives of science are to be congratulated on the success of this entertainment, which will no doubt form a precedent for future ones of a similar kind.

NOTES

COL. PREJEVALSKY is about to set out on a new exploring journey into Central Asia, which will probably last for about three years. His purpose is to explore especially the basin of the Lob-nor from Thian-shan to the Himalayas. Col. Prejevalsky proposes to visit this summer Eastern Thian-shan from Kuloga to Hama, and to pass the winter upo the Lob-nor and in the deserts which extend to the east of this lake, mainly to solve the question as to wild horses and camels. Next spring he will observe the migrations of birds on Lob-nor and proceed to Lhassa. He will then explore the upper course of the Brahmapootra and the northern slopes of the Himalayas, as also Eastern Thibet and Southern China, and if circumstances permit, he will return by Western Thibet and enter Russia by Kashgar. The programme of the expedition is as follows:—1. Geographical and ethnographical descriptions. 2. An itinerary sketch at sight. 3. Astronomical determinations of places. 4. Meteorological, psychometric, and hypsometric observations. 5. Observations of mammals and birds. 6. Botanical, zoological, and mineralogical collections. 7. Photographic sketches. The Russian Geographical Society has expressed its emphatic approval of the programme, and the Emperor has ordered 24,740 roubles to be devoted to the expedition from the treasury.

FROM Commander Cookson we hear that H.M.S. *Petrel* is bringing home two living specimens of the Giant Tortoise of the Galapagos Islands, from Albemarle Island. A large supply of food was provided, and if this does not fail, and at the same time if the cold in the region of Cape Horn has not proved too intense, we may hope to see the specimens alive, for the first time in this country, during next month.

FROM the *Rochester Democrat and Chronicle* (U.S.) we learn that a gentleman of Rochester, New York, who does not wish his name to be published, has, through Prof. Henry A. Ward of that city, given to the University of Virginia, a sum of 5,500^l. to be expended in the formation of a fully appointed cabinet of the

natural sciences, including mineralogy, geology, and zoology. The donor has also given a building, at the cost of more than 4,000 $\text{l}.$, for the collection, to be built near Charlesville, four miles from Monticello. Prof. Ward, in making the collection, will visit the principal European cities.

IN the *Proceedings of the Royal Irish Academy*, p. 427, Dr. Robinson gives us a paper on the theory of the cup anemometer, and the determination of its constants. The paper is an extremely valuable one, as indicating the line of research to be followed in prosecuting anemometrical experiments. So far as we are aware, Dr. Robinson is the first who has formed a just apprehension of the viscosity of the air in its bearings on such experiments, and adopted the necessary precautions in accordance therewith.

AT the meeting of the Edinburgh Botanical Society, held on the 11th inst., an interesting communication was read from the Rev. D. Landsborough, on experiments in growing several Australian plants and trees in Arran, in the Firth of Clyde, including among others the great Australian tree-fern and other tree-ferns, acacias, and gum-trees. The blue gum grew 11 $\frac{1}{2}$ inches the first year, 4 feet the second, and 6 feet the third. The *Eucalyptus pendulosa* also grows well in sheltered situations along the west coast, and Mr. Landsborough expects to see it generally introduced in a few years, and form a valuable addition to our evergreen shrubs.

A CORRESPONDENT writes with reference to the "Plaster cast of portion of antler of reindeer from La Madelaine, Dordogne, France," in the loan collection, the original of which is preserved in France. The thicker end, the label states, is pierced with a hole. "There are as many as four holes in some specimens. Their use is unknown." Our correspondent states that these implements may have been used by former inhabitants of France in the same manner as a very similar tool usually made of deer-horn is now in use or was very recently, by some tribes of the "Red men" of North America. Where bows and arrows are in use, the arrows are made of a very hard and tough willow. This willow may not always be quite straight, or is liable to get warped or crooked in the process of drying. If so, the bends or curves are straightened by the intended arrow being put through the hole in the horn, and a strong pressure applied in the proper direction to counteract the curve. This has sometimes to be done over and over again before perfect straightness is obtained. It may be asked why are three or four holes sometimes found in the same piece of horn? If the holes are of different sizes the reply is not difficult. It is probable that the people who use these tools had wood of different thicknesses (say for arrows and spears) to manipulate; if so, holes of different sizes would be required. It will, he thinks, be generally noticed that the edges of the holes are rounded; this would be done to prevent the otherwise sharp edge injuring the fibre of the wood. Near the specimen referred to, there is one in which one side of the hole has apparently been broken away by a violent strain, possibly applied in the manner and for the purpose above stated.

THE able director of the Royal Zoological Museum of Lisbon, José Vincente Barboza du Bocage, well known for his valuable researches on the natural history of the shores of Portugal, and especially on the Fauna of the Portuguese possessions in Africa, was unanimously elected a foreign member of the Linnean Society at their last meeting, May 4. Prof. William Nylander, of Helsingfors, a cryptogamic botanist of deservedly high reputation, also had the same honorary distinction conferred on him.

PARTS xlvii. and xlviii. of Mr. Dresser's "History of the Birds of Europe," completing the fourth annual volume of this

important work, has just been issued with its usual punctuality. Nearly 400 species of birds have now been figured and described, and as the total European avifauna is probably between 600 and 700 species, three more volumes will be required. These will, almost certainly, be issued within three years from the present date, and we may therefore with great confidence anticipate the successful conclusion of a monograph, which, whether for the beauty of its illustrations, or for the fulness and accuracy of its information, will stand in the very first rank of ornithological literature.

IN Petermann's *Mittheilungen* for May is an article, accompanied by a map, showing the number, classification, distribution, &c., of the institutions for higher instruction in Germany. Following the continuation of the analysis of Prejevalsky's Mongolian travels is an interesting article on the recent travels of Dr. Emil Helub in South Africa, mainly in the Limpopo and Zambesi regions and the region of the salt-pans between Christiana and Mamusa. The information seems to be mainly obtained from the *Diamond News and Griqualand West Government Gazette* of Feb. 23, 1875. Probably the most interesting article is a detailed account of Giles's expedition from Beltana in South Australia, to Perth in Western Australia, in May-November, 1875. Giles's route was on an average four degrees to the south of Forrest's, which, again, was about the same distance south of that of Warburton. Giles has the same barren tale to tell as his predecessors. We believe he is to make a diagonal journey from north-west to south-east, though from this we can hardly expect many new results. A valuable map accompanies the paper in the *Mittheilungen*, which is to be continued.

THE latest news received by the Russian Geographical Society from Dr. Mielchko Maclay is dated from Cheribon (Java) in March last. He announces that before leaving Batavia he sent to St. Petersburg many zoological collections, and will bring his anthropological and ethnographical collections to Europe on his return, in 1877.

A BRANCH of the Russian Geographical Society will probably be shortly founded at Omsk, in Siberia.

M. DE MAINOF, Secretary of the Ethnographical Section of the Russian Geographical Society, has announced to the Society that he is preparing a complete treatise on Russian ethnography. It will appear in parts, each containing a description of a section of the people.

M. L. ESTOURGIES has been charged by the Belgian Government, in company with M. Sylvain Jacquemin, civil engineer, to make a scientific journey through the Transvaal Republic.

THERE is to be a Congress of Alpine Clubs at Pistoja and Florence on June 10 and 11. Several expeditions have been arranged.

MR. J. H. ANGUS has made a gift to the Adelaide University, of a scholarship of 2,000 $\text{l}.$ yearly, tenable for three years, to encourage the training of scientific men, especially civil engineers, with a view to their settlement in South Australia; the winner of the scholarships to spend six months of the term in visiting the great engineering works of Europe or America, towards which the donor gives 100 $\text{l}.$ additional.

MAILS for the Polar ships *Alert* and *Discovery* will be made up for conveyance from Portsmouth on or about May 25, by the steam yacht *Pandora*, Capt. Allen Young having kindly consented to convey letters for the officers and crews of the Polar ships to be deposited at the dépôts. All letters should be sent through the post-office prepaid the inland rate of postage, and addressed "Arctic Yacht *Pandora*, Portsmouth." No letters

containing articles of value should be sent. No newspapers should be sent, as the Admiralty will send a sufficient supply.

THE University of Oxford is to confer upon Dr. Warren De la Rue the degree of M.A. by diploma.

THE ANNUAL Meeting of the Victoria Institute is postponed from the 22nd to the 29th of May.

LIEUT. CAMERON will, on Tuesday next, read to the Anthropological Society a paper on the Anthropology of Central Africa, in the theatre of the Royal School of Mines, Jermyn Street, at 8.30 P.M.

DOCENT THEEL, zoologist, a member of the Swedish Expedition of last year, to Novaya Zemlya, Docent Arnell, botanist, and Dr. Trybom, entomologist, have left Stockholm for Riga, whence they proceed overland to Siberia, where they will remain till autumn, making scientific observations and collections, and returning by the steamer *Ymer*, which Prof. Nordenskjöld has chartered for a voyage to the Yenisei.

M. JANSEN, although he has not yet obtained possession of his regular observatory, has established large photographising telescopes at his residence at Montmartre. He found that during the cold period from the beginning of May up to the 10th, the sun had no spots at all. The photographs are about twenty centimetres in diameter.

C. M. STUART, of Harrow School, has been elected to the Natural Science Exhibition at St. John's College, Cambridge. A second exhibition was at the same time conferred on J. Nall, of Manchester Grammar School.

AT a recent meeting of the French Academy, M. Lecoq de Boisbaudran communicated some further facts regarding the new metal gallium. The specimen he had formerly presented owed its solidity to the presence of a small quantity of foreign bodies. Pure gallium, of which he had now prepared nearly ten centigrammes, melts at about $29^{\circ}5$ C.; hence it liquefies when it is seized between the fingers. It is very easily held in superfusion, which explains how a globule has been kept liquid for weeks in temperatures descending occasionally almost to zero. Electrolysed gallium from ammoniacal solution is identical with that obtained from potassic solution. Once solidified, the metal is hard and resistant, even at a few degrees under its melting point; but it can be cut, and has a certain malleability. Melted gallium adheres easily to glass, on which it forms a beautiful mirror, whiter than that produced by mercury. Heated to a bright red in presence of air, gallium oxidises but very superficially, and does not volatilise; it is not sensibly attacked in the cold state by nitric acid, but in heat the solution operates with liberation of nitrous vapours. The density of the metal (determined approximately from a specimen weighing sixty-four milligrammes) is 4.7 at 15° , and relatively to water at 15° . The mean of the densities of aluminium and of indium is 4.8 at zero. Thus the density confirms theoretical prevision, while the extreme fusibility is a fact completely unexpected.

THE Marine tanks of the Royal Aquarium, Westminster, are being rapidly filled with water brought from Brighton by Messrs. Hudson, who supplied the Crystal Palace. For some time past many of the fresh-water tanks have been stocked, but the first marine fish has but quite recently arrived. It is a somewhat rare one in captivity—the *Motella tricerata* (Yarrell), commonly called the spotted leopard fish. It is placed in a central tank, so that the peculiarity of the "fin" in the neck can be well seen. Couch, in his "History of Fishes," refers to this fin as being always in rapid action, but with this particular specimen it is often at rest. He points out that while its intimate structure shows that it is destitute of any power of propulsion or of regulating motion, it is well furnished with nerves which render it acutely sensible to impression. The functions of the fin have, so far as we know, not been determined.

MR. WALPOLE, on Tuesday, moved for leave to introduce "A Bill for making further provision respecting the University of Cambridge and the Colleges therein." Following the recommendations of the Duke of Devonshire and the Oxford and Cambridge University Commissions, he indicated the nature of the changes desired as follows:—The extension of the professoriat, and a complete organisation of the system of inter-collegiate lectures and classes, for which provision would have to be made over and above that which had already been made, for museums, libraries, and the other apparatus which might be necessary for the prosecution of scientific investigation. The following are the names of the seven Commissioners it is proposed to appoint:—The Bishop of Worcester, Lord Rayleigh, the Lord Chief Justice, the Right Hon. E. P. Bouvierie, Prof. Stokes, Rev. Prof. Lightfoot, and Mr. G. W. Hemmings. Mr. Cross said the Bill might be regarded for all practical purposes as a Government measure.

THE animals deposited in the Gardens of the Zoological Society by H.R.H. the Prince of Wales, include, among others, two Musk Deer (*Moschus moschiferus*) ; two Thar Goats (*Capra jemlaica*) ; four Indian Elephants (*Elephas indicus*), aged about 7, 6, $1\frac{1}{2}$ and $1\frac{1}{2}$ years; five Tigers, (*Felis tigris*) ; a Cheetah (*F. jubata*) ; a Viverrine Cat (*F. viverrina*) ; five Leopards (*F. pardus*) ; an Indian Civet Cat (*Viverricula indica*) ; two Dwarf Zebras (*Bos indicus*) ; seven Indian Antelopes (*Antelope cervicapra*) ; three Axis Deer (*Cervus axis*) ; three Ostriches (*Struthio camelus*) ; several pairs of Impeyan Pheasants (*Lophophorus impeyanus*) ; Cheer Pheasants (*Phasianus wallichii*) ; Horned Tragopans (*Cerornis satyra*) ; Chukar Partridges (*Cuculus chukar*). Besides the Prince's specimens, the following are the most important additions of the week:—Two Secretary Vultures (*Serpentarius reptilivorus*), presented by Mr. M. G. Angel ; an Egyptian Cobra (*Naja haje*), presented by the Rev. G. H. R. Fisk ; and a Maholi Galago (*Galago maholi*), presented by Dr. R. A. Zeederberg, all from S. Africa.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, May 4.—On the Modification of the Excitability of Motor Nerves produced by Injury, by G. J. Romanes, M.A., F.L.S.

It has long been known that when a nerve is cut, or otherwise injured, its excitability at or near the seat of injury undergoes a marked increase. No one, however, has attempted to determine the relative degree of this increase towards make and towards break of the current respectively. The author found that when the nerve-section rested on the *kathode*, the *increase* of excitability was manifested towards *make*, and scarcely at all towards *break*; while, conversely, when the section rested on the *anode*, such *increase* was manifested towards *break*, and scarcely at all towards *make*. These facts are of considerable interest in relation to the theory of electrotonus. The *degree* of the latter increase, however, is out of all proportion greater than that of the former; for while the ratio of excitability before and after cutting was represented by the numbers 36 : 46 in the case of the *kathodic* *make*, such ratio was represented by 2 : 32 in the case of the *anodic* *break*. Mr. Romanes explains this disproportion by the consideration, that as the sensitiveness to the *kathodic* *make* is so much greater than that to the *anodic* *break* before *nerve-section*, after the general sensitiveness of the nerve has been increased by section, the increase has not so much room to assert itself in the former as it has in the latter case, before it reaches zero of the stimulating current's intensity. Thus the figures 2 : 32 :: 36 : 46, though not expressing any *numerical* proportion, may yet express a *real* proportion, if the zero of the current's intensity be represented say by 50 in the above scale of nervous excitability, and if it be granted that the value as a stimulus of any given increment of current is determined by the proportion which such increment bears to the intensity of current that is required to produce adequate stimulation. This explanation is confirmed by a method of graduating the galvanic stimulus other than that of graduating the intensity of the current, viz., by